REPLACEMENT SHEET

FIG. 1

-Sinusoidal Sensorless Control algorithm
-Motor phase current estimation algorithm
-EMI/Lose Optimization algorithm
-Adaptive EMI noise reduction algorithm
--20% efficiency improved operation
-PFC/INV interactive Look-Ahead Control

PMSM

16

10

11

dv/dt controlled Gate Driver IC

18

Gate command

dv/dt command

Appliance Motion cotrol ASIC

v DC bus

Signal Cond.

Single Shunt Current Reconstruction

Reduce Capacitor Size or Eliminate Capacitor

Switching Synchronization Inverter IGBT + PFC FET for EMI reduction

dynamic dv/dt controlled gate drive

Cbus

Gate command

dv/dt command

ACV, tfb

COM

Common mode noise level

Diff mode noise level

dv/dt controlled Buck/ Boost PFC Converter

14

IGBT Loss minimization Dynamic Bus voltage control

Active EMI Filter

L1
AC
L2

12

Active filtering with common/diff mode noise extraction and without current transformer
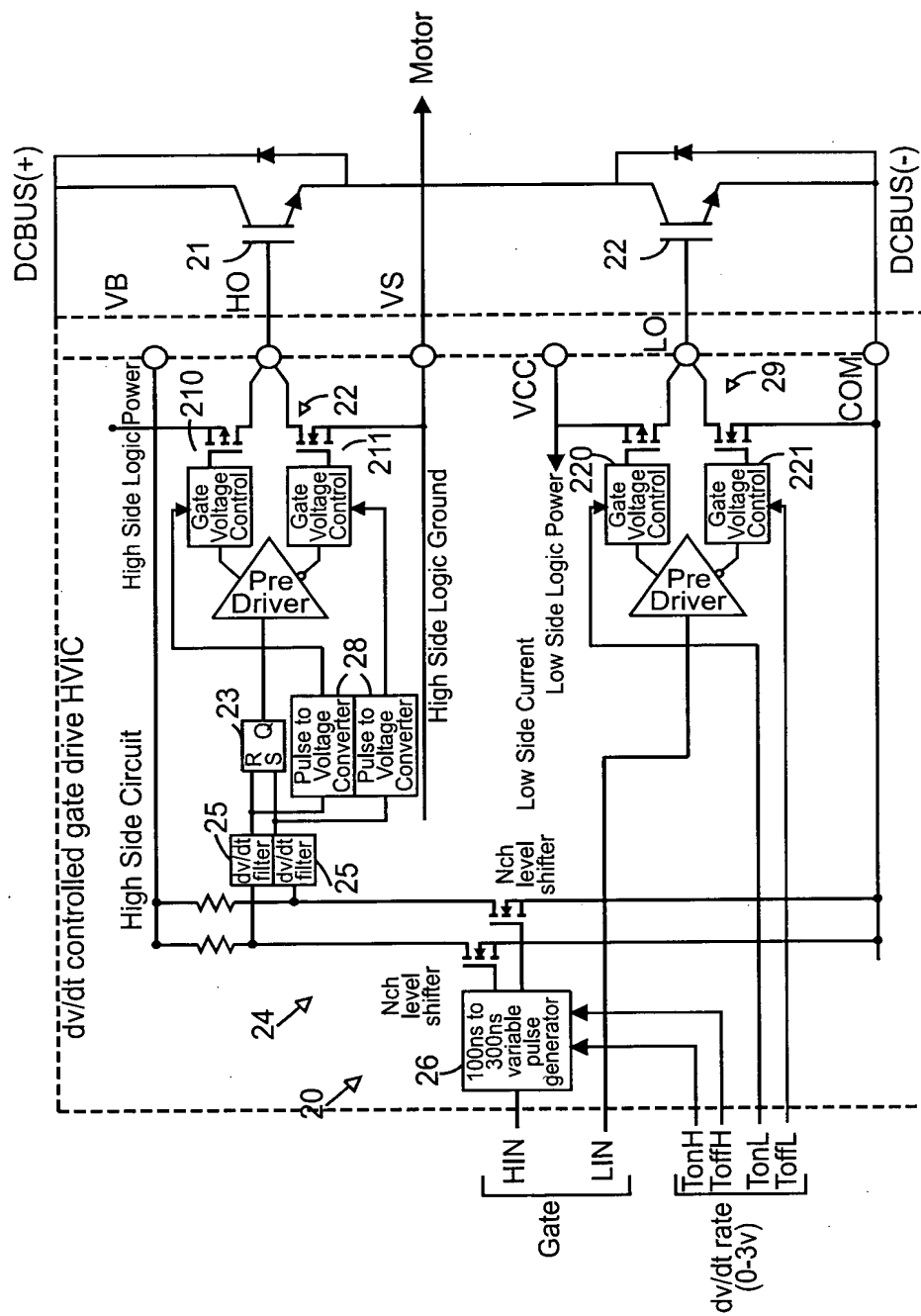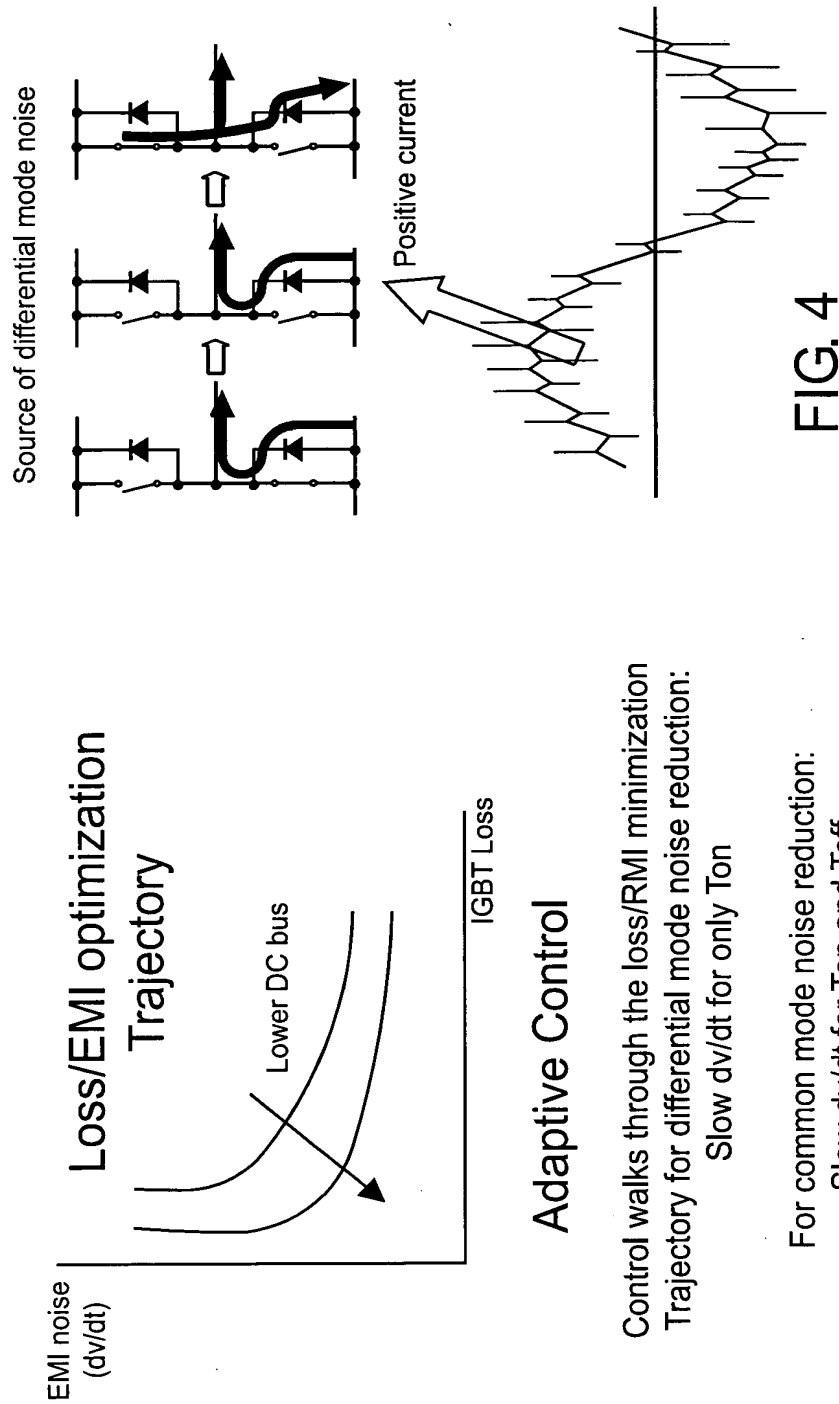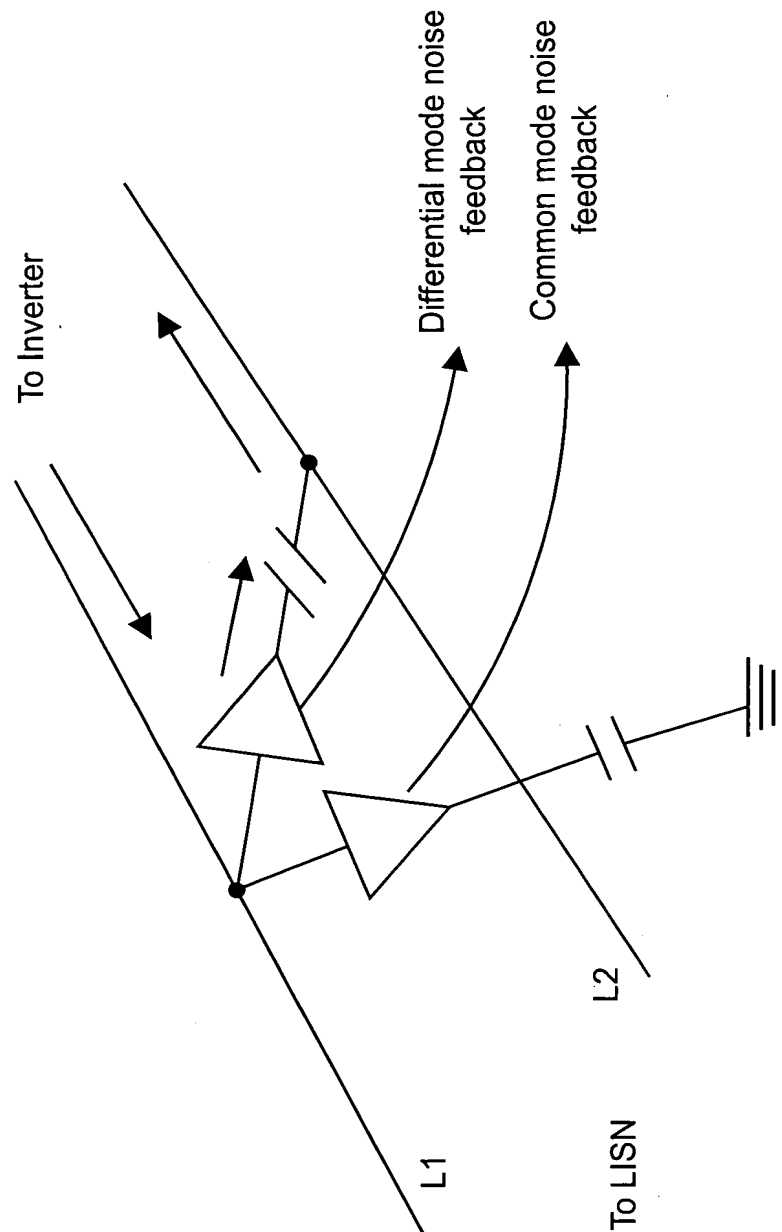
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FIG. 2

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Source of differential mode noise

Positive current

FIG. 4

Loss/EMI optimization Trajectory

EMI noise (dv/dt)

Lower DC bus

IGBT Loss

Adaptive Control

Control walks through the loss/RMI minimization Trajectory for differential mode noise reduction:
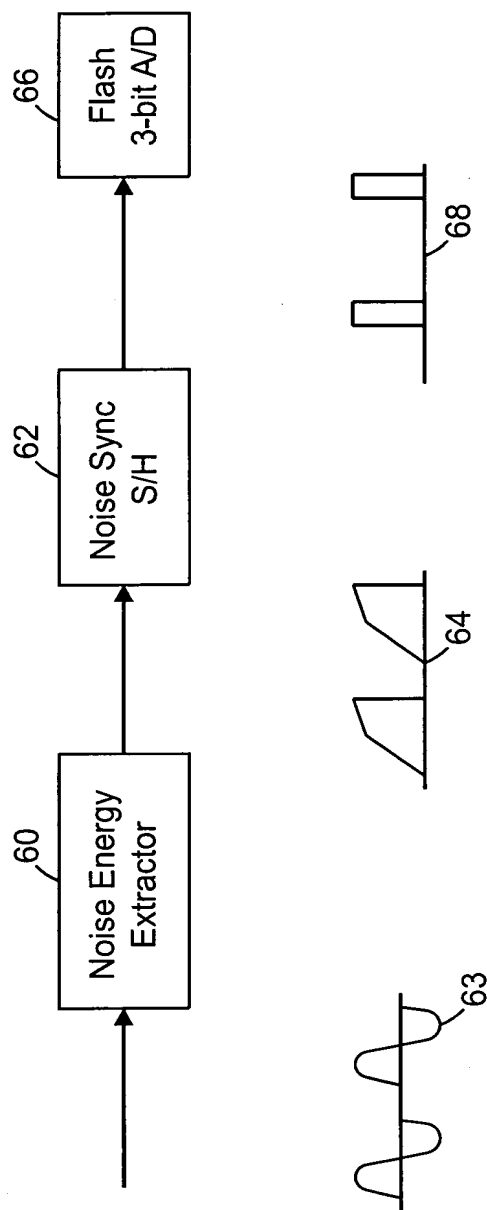Slow dv/dt for only Ton

For common mode noise reduction:
Slow dv/dt for Ton and Toff

FIG. 3

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FIG. 5

REPLACEMENT SHEET

FIG. 6

FIG. 7

FIG. 8

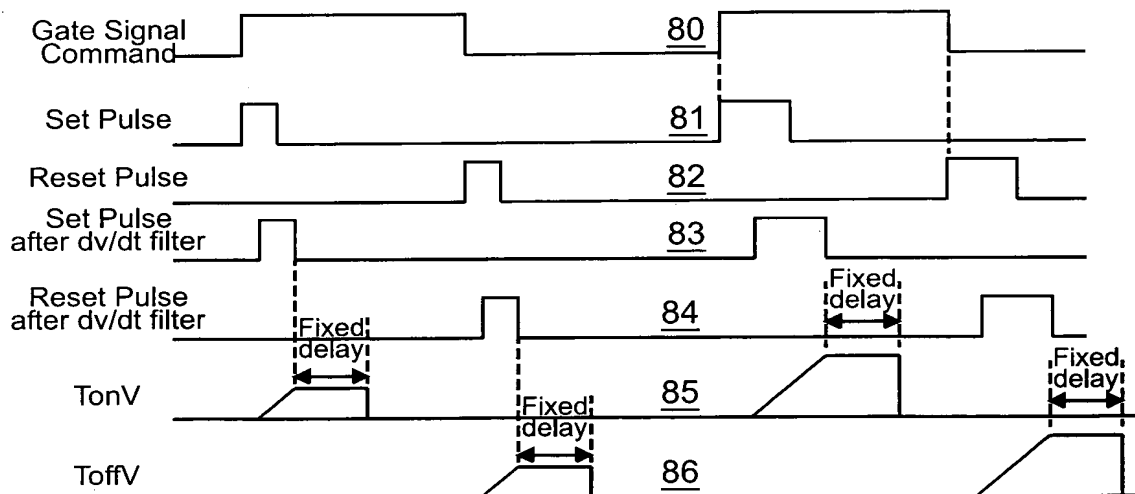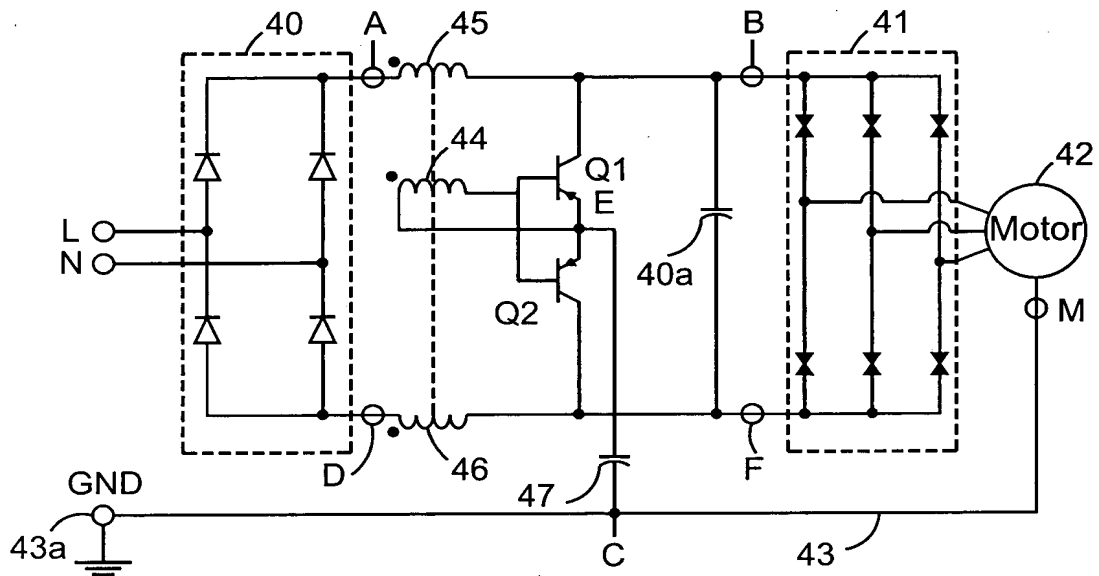USSN: 10/625,958   Applicant: Eddy Ying Yo HO et al.   Atty. Dkt. IR-2314 (2-3588)   Ostrolenk, Faber, Gerb & Soffen
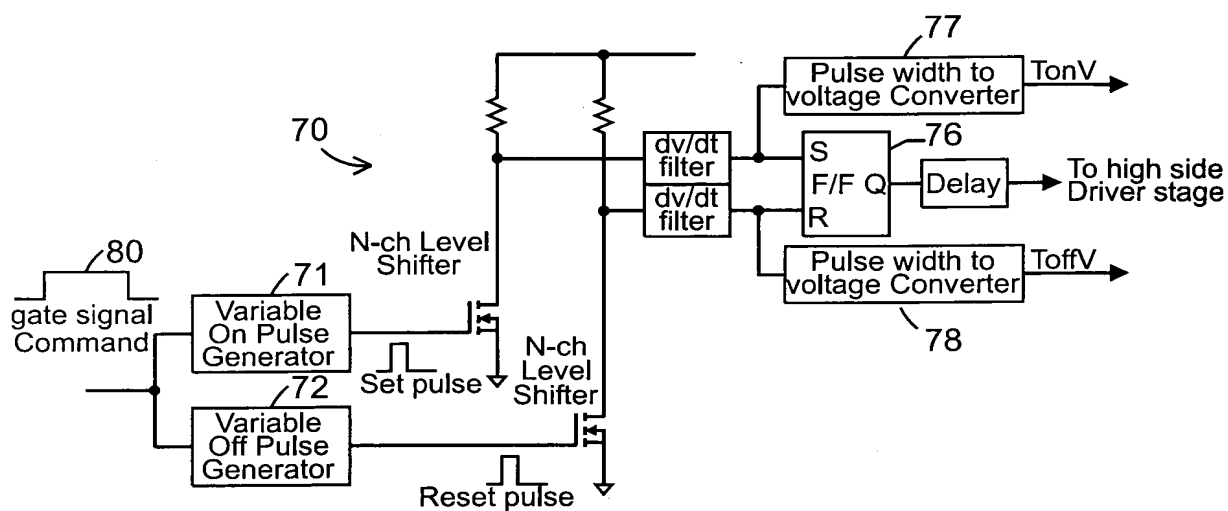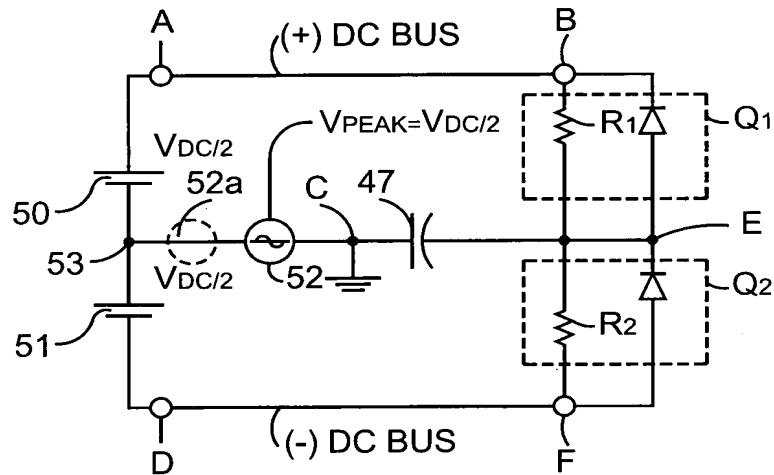
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(PRIOR ART)
FIG. 9

(PRIOR ART)
FIG. 10